AMENDMENTS TO THE CLAIMS

Please amend the claims as indicated in the following listing of all claims:

1. (Currently amended) A thermoelectric structure comprising:

~~a.~~ a ~~solid metal~~ first electrode;

a second electrode;

~~b.~~ a first thermoelement ~~thermally~~ disposed between the first and second electrodes and coupled to the ~~solid metal~~ first electrode; ~~and~~

~~c.~~ a phonon conduction impeding medium disposed between the first and second electrodes, the phonon conduction impeding medium being coupled with the first thermoelement, the phonon conduction impeding medium being thermally insulated from the ~~solid metal~~ first electrode; and

a dielectric material maintaining spacing between at least respective portions of the first electrode and the second electrode.

2. (Original) The thermoelectric structure in accordance with claim 1 wherein the phonon conduction impeding medium is a liquid metal.

3. (Original) The thermoelectric structure in accordance with claim 1 wherein the phonon conduction impeding medium is selected from the group consisting of: gallium, indium, gallium-indium, lead, lead-indium, cesium doped gallium-indium, gallium-indium-copper, gallium-indium-tin and mercury.

4. (Original) The thermoelectric structure in accordance with claim 1 wherein the thermoelement is selected from the group consisting of: p-type Bi-Sb-Te, n-type Bi-Te compounds, superlattices of Bi_2Te_3 and Sb_2Te_3, Bismuth chalcogenides, Lead chalcogenides, complex chalcogenide compounds of Zn, Bi, Tl, In, Ge, Hf, K, and Cs, SiGe compounds, BiSb compounds and skutteridites compounds of Co, Sb, Ni, and Fe.

5. (Cancelled)

6. (Cancelled)

7. (Cancelled)

8. (Currently amended) The thermoelectric ~~device~~ structure in accordance with claim ~~5~~ 1 wherein ~~multiple thermoelectric devices are~~ the first thermoelement is connected electrically in series and thermally in parallel with at least one additional thermoelement.

9. (Currently amended) The thermoelectric ~~device~~ structure in accordance with claim ~~6~~ 1 further including a power source coupled to the thermoelectric ~~device~~ structure such that the thermoelectric ~~device~~ structure operates as a thermoelectric cooler.

10. (Currently amended) The thermoelectric ~~device~~ structure in accordance with claim ~~6~~ 1 wherein a temperature gradient is maintained between the ~~solid metal~~ first and second electrodes such that the thermoelectric ~~device~~ structure operates as a thermoelectric power generator.

11. (Currently amended) The thermoelectric ~~device~~ structure in accordance with claim ~~6~~ 1 wherein at least one of the first and second ~~solid metal~~ electrodes ~~comprise~~ comprises a multi-layered plate of different metals.

12. (Currently amended) The thermoelectric ~~device~~ structure in accordance with claim 11 wherein the multi-layered metal plate is made of Nickel-plated Copper or Aluminum coated with layers of platinum and TiW.

13. (Cancelled)

14. (Cancelled)

15. (Currently amended) A thermoelectric device comprising:

a. a first ~~solid metal~~ electrode;

b. a first thermoelement thermally coupled to the first ~~solid metal~~ electrode;

c. a phonon conduction impeding medium disposed between the first electrode and a second electrode, the phonon conduction impeding medium being coupled with

the first thermoelement, the phonon conduction impeding medium being thermally insulated from the first ~~solid metal~~ electrode;

d. a second thermoelement, the second thermoelement being ~~connected~~ coupled to the phonon conduction impeding medium;

e. ~~a~~ the second ~~solid metal~~ electrode ~~thermally coupled to the second thermoelement~~, the second ~~solid metal~~ electrode being coupled to the second thermoelement and thermally insulated from the phonon conduction impeding medium; and

f. a dielectric material, the dielectric material maintaining spacing between at least a portion of the first ~~solid metal~~ electrode and at least a portion of the second ~~solid metal~~ electrode.

16. (Original) The thermoelectric device in accordance with claim 15 wherein multiple thermoelectric devices are connected electrically in series and thermally in parallel.

17. (Currently amended) The thermoelectric ~~structure~~ device in accordance with claim 15 wherein the phonon conduction impeding medium is a liquid metal.

18. (Currently amended) A thermoelectric device comprising:

a. a first ~~solid metal~~ electrode;

b. a second ~~solid metal~~ electrode;

c. a first phonon conduction impeding medium, the first phonon conduction impeding medium being coupled with the first ~~solid metal~~ electrode;

d. a second phonon conduction impeding medium, the second phonon conduction impeding medium being coupled with the second ~~solid metal~~ electrode;

e. a thermoelement ~~thermally~~ coupled to the first and second phonon conduction impeding mediums; and

f. a dielectric material, the dielectric material maintaining spacing between at least a portion of the first ~~solid metal~~ electrode and at least a portion of the second ~~solid metal~~ electrode.

19. (Currently amended) A method for fabricating a thermoelectric device, the method comprising the steps of:

a. forming a first base structure, the first base structure comprising ~~a silicon dioxide coated silicon wafer~~ a substrate and a first ~~solid metal~~ electrode electrically insulated from the substrate;

b. disposing a first thermoelement on the ~~base structure~~ first electrode;

c. disposing a first phonon conduction impeding medium on the first thermoelement;

d. disposing a second phonon conduction impeding medium on the first ~~metal~~ electrode;

e. forming a second base structure, the second base structure comprising a ~~a silicon dioxide coated silicon wafer~~ a substrate, a second ~~metal~~ electrode, a third ~~metal~~ electrode and a second thermoelement, the ~~polarity~~ conductivity type of the second thermoelement being opposite to the ~~polarity~~ conductivity type of the first thermoelement; and

f. combining the second base structure with the structure resulting after executing step d, the combination resulting in the formation of the thermoelectric device.

20. (Currently amended) The method for fabricating a thermoelectric device in accordance with claim 19 wherein the step of forming a first base structure further comprises:

a. depositing ~~a silicon dioxide~~ an insulating layer on the surface of a silicon wafer; and

b. depositing a composite ~~solid metal~~ electrode structure over the ~~silicon dioxide~~ insulating layer.

21. (Currently amended) The method for fabricating a thermoelectric device in accordance with claim 20 wherein the step of depositing ~~a silicon dioxide~~ an insulating layer is performed using a technique selected from the group of chemical vapor deposition, plasma enhanced chemical vapor deposition and direct thermal oxidation of silicon wafer.

22. (Currently amended) The method for fabricating a thermoelectric device in accordance with claim 20 wherein the step of depositing a composite ~~solid metal~~ electrode structure comprises the steps of:

a. patterning the ~~silicon dioxide~~ insulating layer;

b. etching the patterned ~~silicon dioxide~~ insulating layer to form pits in the ~~silicon dioxide~~ insulating layer;

c. depositing a ~~copper~~ conductive seed layer in the pits;

d. plating ~~copper~~ additional conductive material onto the seed layers to cover up the pits;

e. polishing the surface of the plated ~~copper~~ conductor; and

f. depositing and patterning ~~TiW and platinum~~ additional conductive layers over the plated ~~copper~~ conductor.

23. (Currently amended) The method for fabricating a thermoelectric device in accordance with claim 22 wherein the steps of depositing copper seed layers and depositing ~~TiW and platinum~~ additional conductive layers are performed by physical vapor deposition.

24. (Original) The method for fabricating a thermoelectric device in accordance with claim 22 wherein the step of etching the patterned silicon dioxide layer is performed by plasma etching techniques.

25. (Original) The method for fabricating a thermoelectric device in accordance with claim 22 wherein the step of polishing the surface of the plated copper is performed by chemical and mechanical polishing techniques.

26. (Currently amended) The method for fabricating a thermoelectric device in accordance with claim 19 wherein the step of disposing a first thermoelement comprises the sub steps of:

a. ~~sputtering~~ forming a film of thermoelectric material ~~onto~~ on the base structure;

b. ~~coating~~ forming a photoresist layer with lateral dimensions substantially equal to the dimensions of first thermoelement;

c. etching the film ~~photoresist layer using techniques selected from plasma etching and wet etching~~; and

d. removing the photoresist ~~by dissolving in organic solvents~~.

27. (Original) The method for fabricating a thermoelectric device in accordance with claim 19, wherein the steps of disposing first and second phonon conduction impeding mediums are performed by at least one technique selected from a group consisting of micropipette dispensing techniques, pressure fill techniques and jet printing techniques.

28. (Original) The method for fabricating a thermoelectric device in accordance with claim 19, wherein the step of combining is performed by flip-chip backside-to-front aligners.

29. (Currently amended) A method for fabricating a thermoelectric device, the method comprising the steps of:

~~a.~~ forming ~~a first base structure, the first base structure comprising a silicon dioxide coated silicon wafer and~~ a first ~~solid metal~~ electrode on a first substrate, the first electrode being electrically isolated from the substrate;

~~b.~~ ~~adding~~ forming a first thermoelement on the ~~base structure~~ first electrode;

~~c. depositing and patterning a layer of photoresist over a preselected area of the first base structure;~~

~~d.~~ ~~depositing a layer of a second thermoelement over the structure formed after step c, the polarity of the~~ forming a second thermoelement ~~being opposite to the polarity~~ on the first electrode, the second thermoelement having a conductivity type opposite to the conductivity type of the first thermoelement;

~~e. removing the layer of photoresist by dissolving in organic solvents to form a second base structure;~~

~~f.~~ forming a ~~third base structure by adding~~ a first phonon conduction impeding medium ~~over~~ on the first thermoelement and a second phonon conduction impeding medium ~~over~~ on the second thermoelement ~~of the second base structure~~; forming a second electrode and a third electrode on a second substrate, the second and third electrodes being electrically isolated from the second substrate; and

~~g.~~ ~~combining the third base structure with the second base structure, the combination~~ attaching the second and third electrodes to respective ones of the first and second phonon conduction impeding mediums resulting in the formation of the thermoelectric device.

30. (New) The thermoelectric structure in accordance with claim 1, further comprising a a second phonon conduction impeding medium, the second phonon conduction impeding medium being coupled to the first electrode.

31. (New) The thermoelectric structure in accordance with claim 1, further comprising:

a second phonon conduction impeding medium disposed between the second electrode and a third electrode; and

a second thermoelement having a conductivity type opposite to the conductivity type of the first thermoelement, the second thermoelement being coupled to the second phonon conduction impeding medium and being coupled to the third electrode.

32. (New) The thermoelectric structure in accordance with claim 1, wherein the phonon conduction impeding medium is directly coupled to the first thermoelement.

33. (New) The thermoelectric structure in accordance with claim 15, wherein the phonon conduction impeding medium is directly coupled to the first thermoelement.

34. (New) The method in accordance with claim 29, wherein the second substrate forms at least a portion of a device cooled by the operation of the thermoelectric structure.